

United States Government

Department of Energy  
Rocky Flats Field Office

# memorandum

DATE: **APR 17 2001**

REPLY TO

ATTN OF: AMEI:ER/WM:NC:01-00719

SUBJECT: Fiscal Year 2001 Quick Win Deployment Proposals

TO: Carl Lanigan, Subsurface Contaminants Focus Area, Savannah River Operations Office

The Rocky Flats Field Office (RFFO) is pleased to submit this proposal to the Subsurface Contaminants Focus Area (SCFA) in response to its Fiscal Year (FY) 2001 call for Quick Win Deployments. The Rocky Flats Environmental Technology Site (Site) welcomes the opportunity to partner with EM-50 and the SCFA to support the implementation of the Placement of Evapotranspiration Covers for the Ash Pits and Trench 7 at the Site.

The Site is planning to use Evapotranspiration Covers (ET) to close two landfills and an interim status Resource Conservation and Recovery Act unit. The ET covers have been demonstrated in theory, and in small-scale field tests, to be among the most effective cover design for arid climates. However, large-scale implementations of new ET cover designs have not taken place for landfill closures at Department of Energy (DOE) facilities. Because of the limited contamination at these locations, the Site proposes to close the Ash Pits and Trench 7 using ET covers. This proposal will allow the Site to prove the effectiveness of ET covers prior to implementing the planned large-scale covers, and will provide a more cost effective remedial action for these sites. The cost of constructing an ET cover is far less than excavation and waste disposal of the same areas. If the ET covers can be successfully demonstrated at the Site, it will expedite completion of the ET covers for the larger areas on Site. Consequently, each project site will realize reduced worker health and safety risks during implementation, up to five months of schedule reduction and savings, an estimated \$2 million in cost savings for the Ash Pits, an estimated \$3 million in cost savings for Trench 7, and minimal waste generation with the associated storage, handling, shipping, and disposal costs.

The RFFO and Kaiser Hill Company L.L.C. recognize a need and an application for this proposal. The Site will commit the fiscal year resources identified in the proposal to support this Quick Win proposal. Funding this proposal will directly help the Site address two important Science and Technology needs identified in the FY 2001 *Site Needs and Opportunities List*. The relevant need is RF-ER08 – Capping Design for Arid and Semi-Arid Climates.



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Carl Lanigan  
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The ability of the Site to achieve the end state described in the proposal is based on the current contract between DOE-RFFO and K-H effective February 1, 2000. We look forward to selection as a Quick Win Deployment Site and continued involvement with SCFA.

If you have any questions, please contact Norma Castaneda at (303) 966-4226 or Gary Huffman at (303) 966-7490.



Joseph A. Legare  
Assistant Manager  
for Environment and Infrastructure

Enclosure

cc w/Enc.:  
N. Castaneda, ER/WM, RFFO  
G. Huffman, CP, RFFP  
L. Butler, K-H  
Administrative Record

# Placement of an Evapotranspiration Covers for the Ash Pits and Trench 7 at Rocky Flats Environmental Technology Site

## 1.0 Technical Proposal

Rocky Flats Environmental Technology Site (Site) must complete over 100 remedial actions leading to Site closure by 2006. The current Baseline has excavation activities for the Ash Pits and Trench 7 scheduled to begin in fiscal year 2003 and 2004, respectively. Both the Ash Pits and Trench 7 contain limited contamination and are located in areas generally above the water table. As a result, there is very limited groundwater contamination in these areas.

The Site is planning to use Evapotranspiration Covers (ET) to close two landfills and an interim status RCRA unit. ET covers have been demonstrated in theory, and in small-scale field tests, to be among the most effective cover design for arid climates. However, large-scale implementations of new ET cover designs have not taken place for landfill closures at DOE facilities. Because of the limited contamination at these locations, the Site proposes to close the Ash Pits and Trench 7 using ET covers. This proposal will allow the Site to prove the effectiveness of ET covers prior to implementing the planned large-scale covers, and will provide a more cost effective remedial action for these sites.

## 1.1 Deployment Approach

The ER baseline is currently scoped as excavation of contaminated soils with offsite shipment of the excavated soils. Should an accelerated deployment of an ET cover design be acceptable to the regulators and stakeholders, it would provide multiple benefits for both Rocky Flats and the DOE complex.

The existing planning in progress for the large ET covers can be utilized immediately for these smaller projects, enabling them to be used as test cases at the Site. Lessons learned on the small covers can then be applied immediately to the large covers. Cost and performance data acquired during this project will help to reduce uncertainties in the current Baseline estimate and provide technical performance data to help regulators and stakeholders understand the closure cover approach and streamline the decision process for future covers.

ET covers are relatively new technology and need to be clearly explained to the stakeholders. One of the authors of the forth-coming revised EPA guidance on caps and covers, Steve Dwyer, is already available throughout the ongoing Site project and will add credibility and experience to the stakeholder information and approval process.

The design for an ET cover is significantly less complex than the engineering design for standard RCRA caps. Some of the variables already being addressed by the large ET cover projects, and could be applied immediately to this project, include:

- The depth and type of soil material to design an effective ET cover that satisfies RFCA Attachment 10 section I requirements
- Design Concentration Limits (DCLs) calculated to be protective of surface waters, segment 4a and 4b standards
- Existing configuration of groundwater plumes

A preliminary assessment and evaluation must be undertaken to define the area of the cap and perform modeling studies for the ET cover. This assessment will define the cover boundary, identify the primary contaminants of concern, their respective concentration levels, and perform modeling studies for the ET cover using UNSATH to determine the effectiveness of the cover in conjunction with fate and transport modeling. It is anticipated that the subcontractors already performing the assessment for the larger covers can accomplish this additional work.

After the preliminary assessment and evaluation are complete, a detailed Design Package will be developed containing the drawings, specifications, and procurement package. A Proposed Action Memorandum will be written and approved by the Regulators after completion of the public comment period. A subcontractor will then be acquired to build the ET covers.

## **1.2 Technical Merit**

The Ash Pits were used for disposal of ash from the incinerator. They are approximately 150 to 200 feet in length, 12 feet wide, 10 feet deep and covered with between 0.5 and 3 feet of earth. The incinerator was used to burn general site wastes and small quantities of depleted uranium. An ash-sampling program documented approximately 1 to 8 kilograms of depleted uranium per ton of ash. Also found was uranium 233, 234, 235, and 238 isotopes, and low-levels of antimony, beryllium, cadmium, copper, molybdenum, mercury, nickel, and silver.

Trench 7 was used for disposal of sewage sludge. However, data from three bore holes completed within Trench 7 indicate the presence of radiological and volatile organic compound (VOC) contamination above subsurface soil action levels. Trench dimensions are 115 feet in length, 15-foot width, and 10-foot depth.

ET covers are expected to perform better than RCRA Caps in semi-arid climates such as found at the Site. While the technical superiority is well understood by experts in the field, this has not been clearly communicated to the stakeholders and general public.

The hydrogeologic setting and contaminants in the ash pits and Trench 7 create an ideal setting to demonstrate the effectiveness of ET covers. These covers are a long-term solution for the areas and are expected to meet the requirements for the designated land use after Site Closure.

## **1.3 Site Need**

The Rocky Flats ER Baseline currently contains funding to perform source removals at these two areas. However, review of the types of contaminants present in the hydrogeologic setting indicate that excavation is not the most effective remedial action for these areas. In addition, the Ash Pits are located in an environmentally sensitive area within a Listed Species habitat. The ET covers will fulfill the requirement for remedial action and provide an opportunity for early evaluation of this type of cover at the Site.

## **1.4 Technology Selected**

As discussed above, ET covers are a long-term solution and are expected to perform better than RCRA Caps in semi-arid climates.

## **1.5 Integrated Safety Management System integration**

ISMS is part of all work conducted at Rocky Flats and will continue to be integrated into this project. Workers will assist in development of the job hazard analysis required for this project. Worker input again will be actively solicited during performance of this work scope.

Lessons learned from similar projects across the complex will be incorporated into the work implementation documents as appropriate. Lessons learned from this project will also be utilized for the larger ET cover projects to follow. Meetings will be held daily during fieldwork to discuss the work in progress, voice concerns, identify issues and develop solutions.

Use of the new technology instead of traditional excavation will also minimize worker health and safety risks and the environmental impacts caused by excavation. Workers will be at less risk because their contact with contaminated media is minimal because an ET cover will be built over possible contaminated materials. Use of heavy equipment and associated risks, will be minimized. The potential for air releases is minimal due to the small quantity of material exposed. Habitat damage will be minimized, because of the small area disturbed. Spill potential will be minimized because contaminated materials will not be exposed at the surface.

## **1.6 Stakeholder/Regulatory Acceptance**

The Colorado State Department of Health and Environment (CDPHE) technical representative advocates the use of these types of covers. Meetings and discussions have been held with both the CDPHE and EPA representatives. Public meetings will be held and it is expected that Steve Dwyer will participate.

## **2.0 Cost Proposal**

### **2.1 Cost Benefit Analysis**

Excavation with treatment or dispositioning of soils has been the preferred remedial action for contaminated soils at Rocky Flats. Along with the increased worker safety and health risks associated with working with heavy equipment, these are expensive, time-consuming projects. If ET covers are effective at Rocky Flats, substantial cost and schedule savings could be realized to facilitate closure of the Site.

For comparison, the estimated cost for field implementation of the Ash Pit remedial action cost is approximately \$2.3 million and take 8 months for excavation and disposal of the contaminated soils. Field implementation of the Trench 7 remedial action is estimated to cost \$3.2 million and take 6 months.

The installation of ET is anticipated to cost around \$500,000. The long-term monitoring costs required for this remedy would be significantly more than that required for an excavation action. However, the additional monitoring costs would be funded by the Site.

### **2.2 OST Funding Request**

In developing the cost estimate, it was assumed that much of the work performed to date on the Site ET cover projects can be applied immediately to the Trench 7 and Ash Pit Projects.

Planning and Engineering Design	Project Management 500 hours @ \$80/hr	\$197,000
Construct ET Covers	\$150 k per ha, (based on "Performance And Cost Consideration For Landfill Caps In Semi-Arid Climates", Ankeny, et al ) 2 ha area estimate – 1 ha for Trench 7 area, 1 ha for ash pits.	\$300,000
Total		\$497,000

### **2.3 Amount of Funding/Services provided by the Site**

The Site will perform any required characterization for these projects. In addition, the Site will write the required decision documents, perform the associated readiness reviews, and write the project closeout report at an estimated cost of \$100,000 per project. In addition, the Site will provide significant technical support including modeling support as part of the ongoing ET cover projects. The Site will also fund the additional, long term performance monitoring required for the ET covers.

### **2.4 Current and Out-Year Spend Plan**

The funding detailed in section 2.2 above will be spent in the year received, assuming that funds are received at the beginning of a fiscal year. Out-year costs will be borne by the Site.

### **3.0 Project Baseline Summary Benefit**

As noted in section 2.1, the cost of constructing a ET cover is far less than excavation and waste disposal of the same areas. Both the Ash Pits and Trench 7 remedial actions are currently scoped for excavation with offsite dispositioning of the excavated soils. As presently scoped, backfill will be purchased from offsite sources to fill the excavations.

If the ET covers can be successfully demonstrated at Rocky Flats, it will expedite completion of the ET covers for the larger areas on Site. The benefits for each project site are:

- Reduced worker health and safety risks during implementation,
- Up to five months of schedule savings
- Estimated \$2 million cost savings for the Ash Pits
- Estimated \$3 million cost savings for Trench 7
- Minimal waste generation with the associated storage, handling, shipping and disposal costs

### **4.0 Performance Milestones**

Following are the proposed milestones:

- EPA and CDPHE acceptance of Decision Document
- End of Public Comment Period
- Finalization of Decision Document

- Completion of Design
  - Initiation of field work for each area
  - Completion of field work for each area
  - Completion of Project Report
  - Completion of Technology Safety Data Sheet
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